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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/765,791	01/27/2004	Shuzo Sato	075834.00478	2601
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ROBERT J. DEPKE LEWIS T. STEADMAN ROCKEY, DEPKE & LYONS, LLC SUITE 5450 SEARS TOWER CHICAGO, IL 60606-6306				
EXAMINER LEADER, WILLIAM T				
ART UNIT		PAPER NUMBER		
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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/765,791	<b>Applicant(s)</b> SATO ET AL.	
	<b>Examiner</b> William T. Leader	<b>Art Unit</b> 1753	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 16 January 2007.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 50-91 is/are pending in the application.
- 4a) Of the above claim(s) 67-89 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 50-66,90 and 91 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 January 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☒ Certified copies of the priority documents have been received in Application No. 09/955,668.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | 5) <input type="checkbox"/> Notice of Informal Patent Application                       |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)<br>Paper No(s)/Mail Date <u>1/27/2004</u> . | 6) <input type="checkbox"/> Other: _____  |

### **DETAILED ACTION**

1. Applicant's election of Group I, claims 50-66 and 90-91 in the reply filed on January 16, 2007, is acknowledged. Because applicant did not distinctly and specifically point out the supposed errors in the restriction requirement, the election has been treated as an election without traverse (MPEP § 818.03(a)).
2. Applicant's response indicates that claims 88-89 were cancelled in a previous Restriction Requirement. However, the response filed on September 25, 2006, stated that claims 88-89 were withdrawn from prosecution. Consequently, claims 88-89 are still in the application. Claims 67-89 are withdrawn from consideration.

#### ***Claim Rejections - 35 USC § 112***

3. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
4. Claims 50-66 and 90-91 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.
5. Claims 50-66 and 90-91 are directed to apparatus. The preamble of claim 50 recites the intended use of polishing an object having a film on a surface to be polished. Claim 50, lines 6-7 recite a cathode member "relatively small compared with the surface". This limitation is indefinite because the object having a film on a surface is the workpiece being treated by the apparatus and is not a part of the apparatus itself. The apparatus is capable of polishing object of

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various sizes and it is not possible to know what size of workpiece is to be treated. The size of the cathode should be recited with respect to another element of the apparatus (such as the table for holding the object) rather than the object to be treated. See MPEP 2115. Claims 51, 60 and 91 also include a limitation based on the object to be polished or plated.

***Claim Rejections - 35 USC § 102***

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

7. Claims 50-60, 62-66, 90 and 91 are rejected under 35 U.S.C. 102(e) as being anticipated by Wang (U.S. 6,447,668).

Wang discloses an electropolishing apparatus which includes:

wafer chuck 29 which serves as a table for holding wafer 31 to be polished (see column 11, lines 8-9 and figures 28A and 28B);

means for measuring the voltage and current of the power supply to determine resistance of the layer being etched which corresponds to the thickness (column 12, line 46 to column 14, line 57);

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cathode jets 254 which are relatively movable with respect to the wafer 31 and are small with respect to the chuck 29 for holding the wafer 31 (column 37, lines 1-30; figures 28A and 28B and figures 32A and 32B);

pump 33 for feeding electrolytic solution between a region of the surface of the wafer 31 and the cathode (column 37, lines 18-19 and figures 28A and 28B);

power supply 200 for applying a voltage with the cathode member serving as a cathode and the wafer as an anode (column 37, line 17 and figures 28A and 28B);

means to turn off power supply 200 when the thickness of the metal layer reaches a set value (column 37, lines 24-26); and

moving means for moving the cathode jet 254 to other regions of the surface of the wafer (column 37, line 27).

Thus all elements recited in claim 50 are disclosed by Wang.

8. Claim 51 recites that the film on the surface to be polished is copper. As explained above, the object being treated is not a part of the apparatus and does not distinguish apparatus from the prior art. See MPEP 2115. The apparatus of Wang is capable of polishing a copper film (see column 8, lines 17-20 and figure 1A which depicts copper layer 121). With respect to claim 52, Wang discloses a control system which may include a computer system which is capable of calculating the amount of film to be removed (see column 13, lines 44-63).

9. A number of applicant's claims are written using process-type language such claim 53 which recites "the measuring means measures a thickness." This claim limitation is interpreted as meaning the measuring means is adapted to or is capable of measuring thickness. With

respect to claim 53, Wang discloses calculating resistance of the film being polished (based on measured voltage and current) which corresponds to the thickness of film remaining (see column 14, lines 36-58). The calculating means of Wang is capable of measuring thickness as recited in claim 53. With respect to claims 54 and 55, Wang specifically states that current and voltage can be monitored to determine when to stop electropolishing, i.e., determining the end-point (column 14, lines 29-31). In the embodiment described in conjunction with figures 28A and 28B, the power supply 200 is turned off when the thickness of the metal layer 121 reaches a set value (column 37, lines 18-26). Thus, the apparatus of Wang is capable of functioning in the manner recited in claims 54 and 55.

10. With respect to claim 56, the cathodes disclosed by Wang are adapted to supply a stronger electric field to a projecting portion. Note that an applied electric field generally concentrates at projections. See, for example, Niuya et al (6,607,650) at column 8, lines 3-8. With respect to claim 57, Wang discloses embodiments in which the cathode is divided into a plurality of regions which are insulated from each other, and the cathode as a whole faces the entire surface. The effective position of the cathode is changed by activating different cathode elements. See column 12 and figures 7A and 11A where elements 1, 2, and 3 make up portions of the cathode and are separated by dielectric walls. Other figures such as figures 18A similarly show a multi-element cathode. With respect to claim 58, the cathode regions illustrated by Wang in figures 7A and 11A shows the cathode to be divided into a plurality of concentric circular regions.

11. With respect to claim 59, Wang discloses an additional electrode member facing the surface and set apart from the cathode member and capable of functioning as an anode. See column 38, lines 8-21, figures 32C and 32D. The electrolyte feeding means is adapted to feed electrolyte solution between the region of the surface and the cathode member, and between the surface and the anode member. See the flow arrows in figure 32D. With respect to claim 60, as noted in the rejection under 35 U.S.C. 112, second paragraph, the surface being treated is not a part of the apparatus. The apparatus of Wang is capable of polishing an object less noble than the anode. It is well-known to use anodes of a metal such as platinum because they resist dissolution and corrosion.

12. With respect to claims 62, 63 and 64, Wang discloses that the power supply can be operated in direct current mode or a variety of other modes including pulsed direct current and alternating current. See column 11, line 66 to column 12, line 9 and figure 8.

13. Claim 65 recites the inclusion of an ammeter. An ammeter is a device which measures current. As noted above, Wang teaches measuring current and, consequently, suggests the use of an ammeter. With respect to claim 66, the computer control system of Wang is capable of being operated to maintain a constant current. See region BC in figure 56 which shows constant current.

14. With respect to claim 90, the structure of the apparatus is essentially the same as that recited in claim 50. However, the preamble recites a "plating apparatus for depositing a plating film" whereas the preamble of claim 50 recites a "polishing apparatus for polishing an object having a film." The difference between the apparatus of claim 50 and that of claim 90 resides in

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the polarity of the voltage applied to the apparatus electrodes and the object being treated. Wang discloses that the apparatus is capable of being used for electroplating as well as electropolishing. Cathodes 1, 2 and 3 are charged positively and wafer 31 is charged negatively, so that wafer 31 is suitably electroplating rather than being electropolished. See column 10, lines 45-56..

***Claim Rejections - 35 USC § 103***

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

17. Claim 61 rejected under 35 U.S.C. 103(a) as being unpatentable over Wang in view of Talieh (US 2003/0006147).



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18. Wang is applied as above. Claim 61 differs from the apparatus of Wang by reciting that the apparatus further comprises polishing means for chemical mechanical polishing. The Talieh patent is directed to apparatus for electrochemical-mechanical deposition.. As shown in figure 1B, pad 32 is provided to allow chemical-mechanical polishing. See paragraph 0028. The apparatus also function to perform electrolytic polishing. See paragraph 0033. The prior art of record is indicative of the level of skill of one of ordinary skill in the art. It would have been obvious at the time the invention was made to have included polishing means for chemical mechanical polishing in the apparatus of Wang as taught by Talieh because such means would have assisted in providing a uniformly flat substrate.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to William T. Leader whose telephone number is 571-272-1245. The examiner can normally be reached on Mondays-Thursdays and alternate Fridays, 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on 571-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Wf

William Leader  
July 5, 2007

*Amy Sung Foster*  
Supervisory Patent Examiner